RICH FEM Trigger Input Status and Schedule

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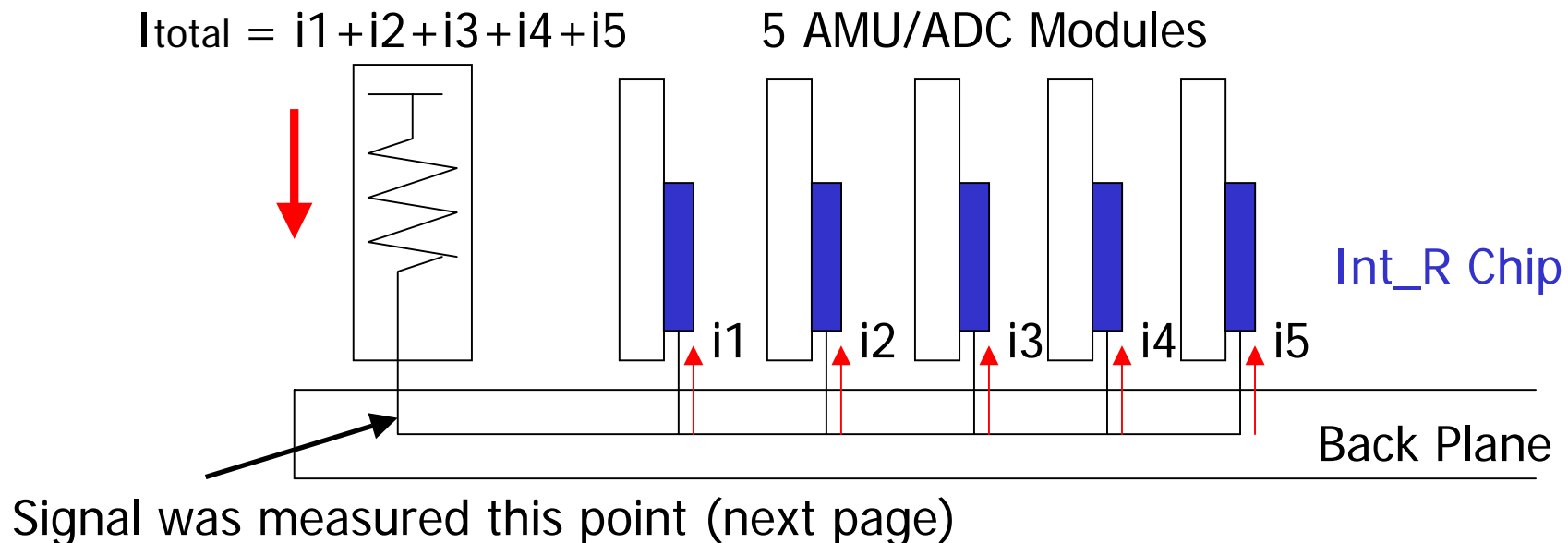
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Summary of RICH LVL1 in pp run

- **We had following type of LVL1 Channel (total 256) in pp run**
  - Working Channel 38 (14.8%)
    - Good correlation between charge and trigger bit
  - Noisy Channel 74 (28.9%)
    - Trigger signal was firing frequently
  - Dead Channel 144 (56.3%)
    - No trigger signal
- **Two RICH FEE crate were sent to Japan for investigation after pp run .**
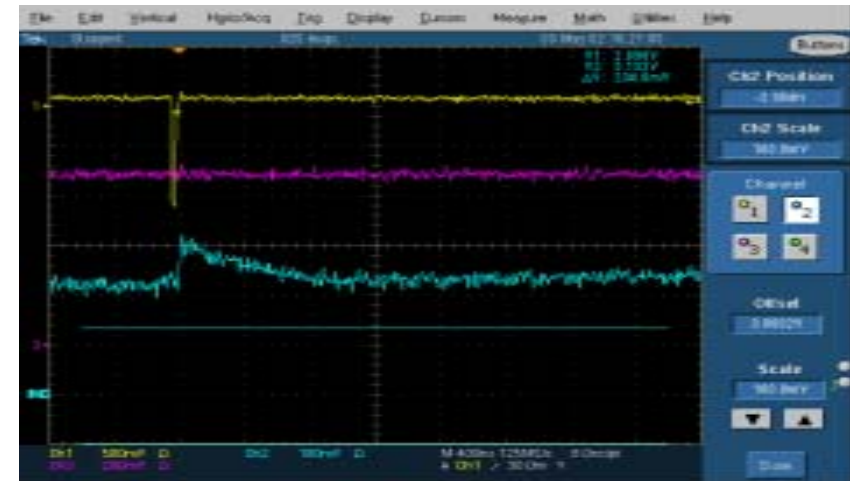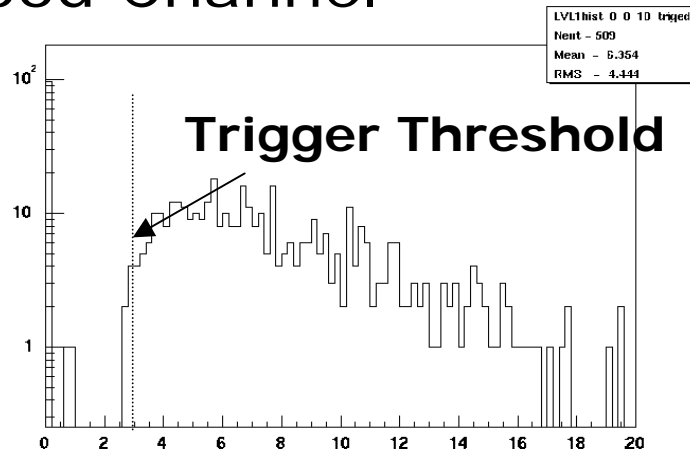
Location of the bug

- **2 possible location of the bug**
  - Signal source : Int_R Chip on AMU/ADC Module
    - Int_R Chip produce the trigger signal.
  - Signal processing : LVL1 Module
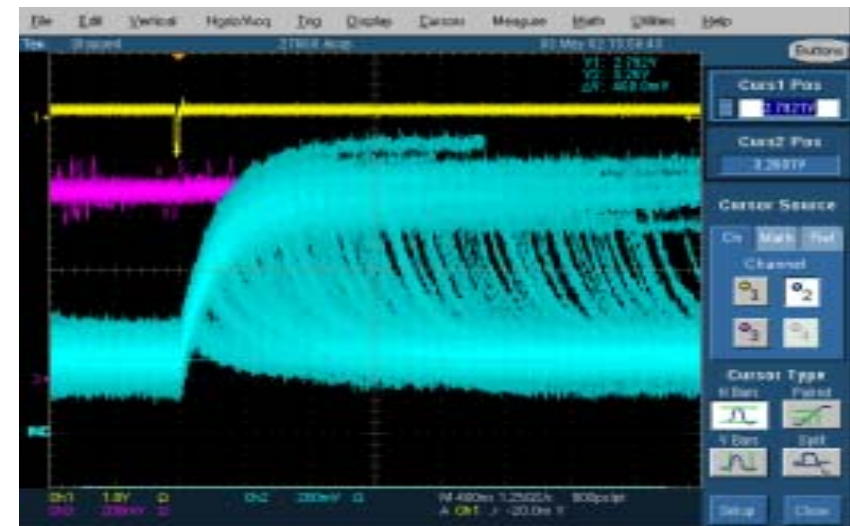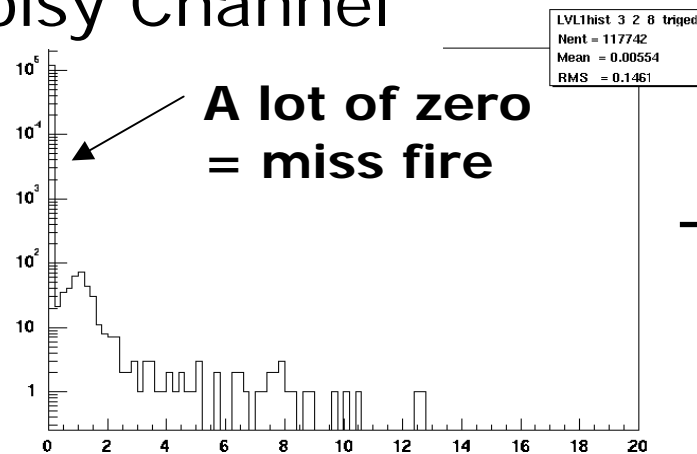   - We have some parameters (Timing of AD conversion etc.).

$I_{total} = i1+i2+i3+i4+i5$ 5 AMU/ADC Modules

i1   i2   i3   i4   i5

Int_R Chip

Back Plane

Signal was measured this point (next page)

LVL1 Output of Int_R Chip

Good Channel

Trigger Threshold

Noisy Channel

A lot of zero = miss fire

Charge distribution when Trigger bit is required (from pp run)

Wave form of the corresponding channel

Debug

- **What's happen in noisy channel?**
  - **Trigger reset** is not working correctly
    - A lot of miss-fire
    - After comparing noisy channel with good channel, bias voltage supplied to Int_R chip found to be different
    - This bias voltage makes trigger reset signal unstable
- **How can we fix it?**
  - **Tune the bias voltage**
  - 16 resistors on a AMU/ADC Module need to be replaced
- **After fixing the bias, we found that dead channel recovered as well as noisy channel.**
  - Int_R Chip itself is fine.
  - **Problem was "tuning"**

What we need to do

- **Tune the bias voltage of the Int_R chip on AMU/ADC Module**
  - Replace the resistors on it
- **Check all LVL1 signals**
  - OK　　　: Go to Production test
  - Not OK : Replace Int_R Chip
    　　　　　　Investigate the problem one by one
- **Production test of whole RICH FEE**
  - Performance of Charge, TAC and LVL1

Schedule

- **May**
  - Fix the bias voltage of Int_R chip on AMU/ADC Module.
  - Check LVL1 signals again.
- **June**
  - Start production test of all modules on RICH FEE crate.
    - This will take one month or more
- **July**
  - production test of all modules on RICH FEE crate.
- **August**
  - Start to ship the RICH FEE crate to BNL